

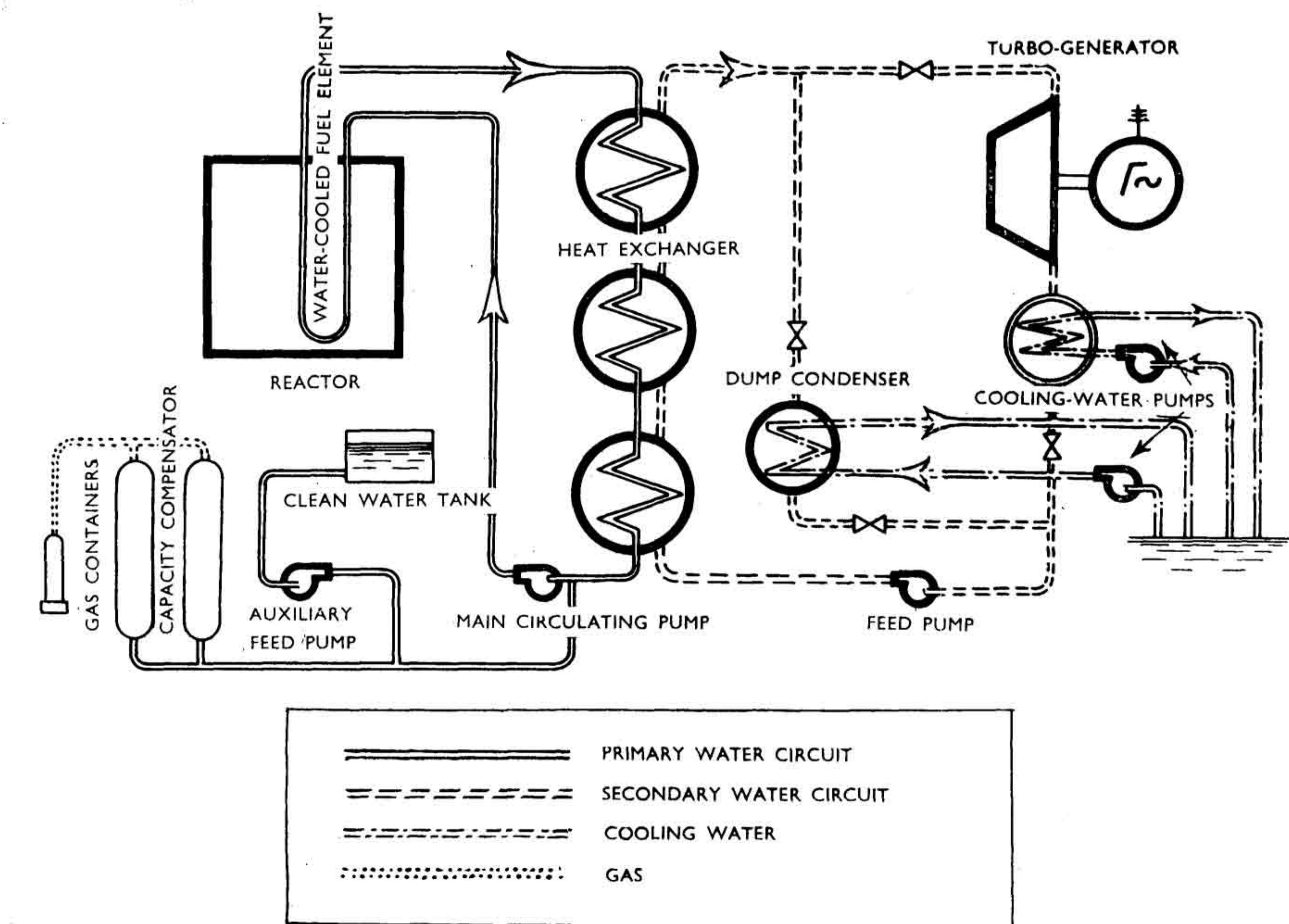
The World's Reactors

No. 7—5-MW POWER REACTOR

РЕАКТОР ПЕРВОЙ АТОМНОЙ ЭЛЕКТРОСТАНЦИИ
МОЩНОСТЬЮ 5000 кВт, действующей в СССР с 27 июня 1954 года.

Drawings supplied by the Ministry of Electrical Power
Stations of the U.S.S.R., Technical Administration, at the
request of the Minister, Mr. G. M. Malenkov.

Принципиальная схема электростанции.



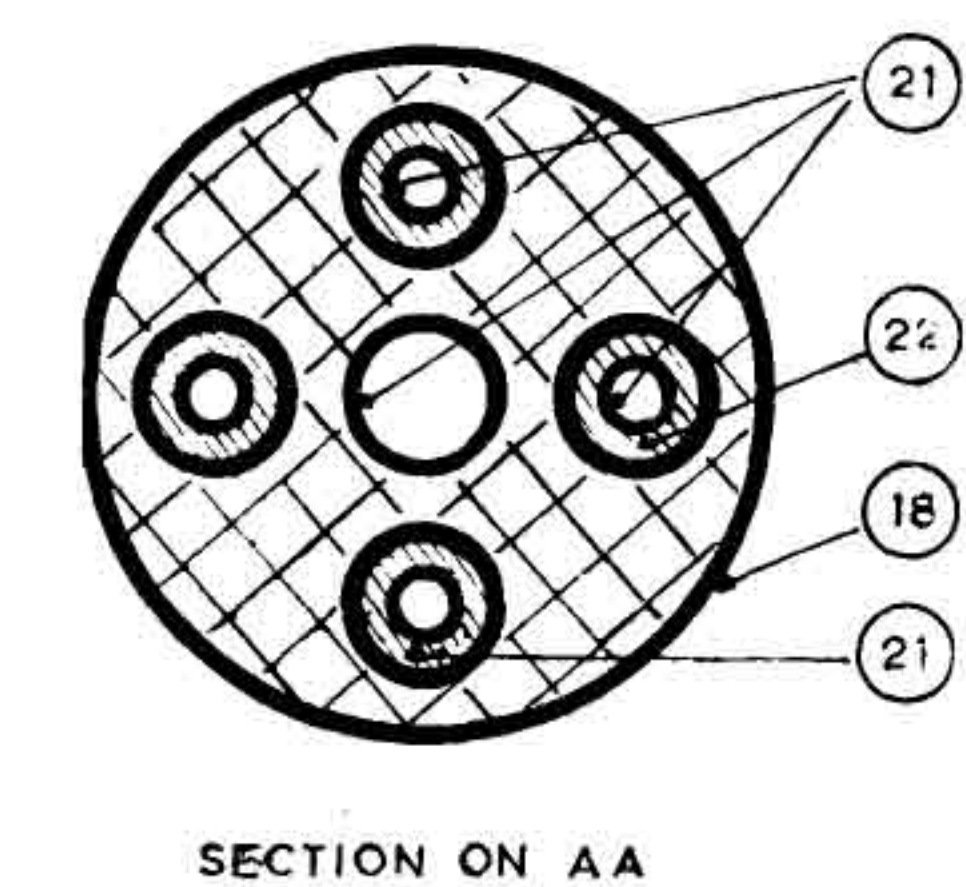
Flow diagram. The primary cooling water enters the heat exchanger at 260-270°C (100 atm.) and leaves at 190°C. Steam temperature is 255-260°C (12.5 atm.).

KEY

1. Graphite reflector
2. Containment tank
3. Concrete
4. Bottom Plate
5. Top plate
6. Fuel element
7. Safety-rod servo motor
8. Control rods
9. Water jacket
10. Condenser
11. Water inlet duct to fuel channels
12. Water inlet
13. Water outlet duct from fuel channels
14. Cast-iron top shielding
15. Cooled reflector mounting
16. Control-rod operating mechanism
17. Control-rod coolant pipes

Fuel Element (6)

18. Graphite cylinder
19. Water inlet
20. Water outlet
21. Thin-walled stainless steel water pipes
22. Annular fuel element



Details of one of the
water-cooled fuel-
element units.

The 5,000-kW electrical output, water-cooled, graphite-moderated, enriched-uranium-fuelled reactor of the U.S.S.R. Academy of Science. It went into operation on June 27, 1954.

The World's Reactors—No. 7

5-MW ATOMIC POWER REACTOR

TYPE:	Thermal heterogeneous.
PURPOSE:	Experimental power production.
LOCATION:	Academy of Sciences, near Moscow.
CAPACITY:	5 MW electricity from one turbo-generator. Heat rating: 30 MW. Four pairs of heat exchangers provided—one as stand-by. Maximum flux: 5.10^{13} n/cm. ² -sec.
OPERATION:	Commissioned June 27, 1954.
FUEL:	Enriched uranium, 5% U ²³⁵ . U as cylindrical tubes. Stainless steel clad inside and out. Graphite elements contain four rods, each with cooling channels. Total number of rods: 128. Total charge: 550 kg. Charge for criticality: 260 kg. Maximum graphite temperature: 700°C.
BURN-UP:	0.8 U ²³⁵ —16% of fuel.
CONVERSION FACTOR:	U-Pu: 0.32.
MODERATOR:	Graphite and light water.
CORE:	Overall size: 5 ft. dia. × 5 ft. 6 in. high.
REFLECTOR:	Graphite, in steel tank, N ₂ or He pressurized. Overall size: 9 ft. dia. × 10 ft. high (approx.), 5 ft. above, 2 ft. below (approx.).
COOLANT:	Light water at 100 atm. Flows down centre of elements and up fuel tubes. Throughput at peak power: 300 tons/hr. Inlet temperature: 190°C. Outlet temperature: 270°C. Maximum activity: 0.2 c/l. After 1 minute: 2.10^{-5} c/l.
HEAT EXCHANGERS:	Maximum throughput: 40 tons/hr. Pressure: 180 p.s.i. Temperature: 260°C.
CONTROL:	Boron carbide rods, water cooled. Six near core centre, 12 at extremities. Four additional servo-controlled shim rods, located in reflector. Two safety rods in core.
SHIELDING:	Water: 40 in. radial thickness. Concrete: 120 in. radial thickness.

A limited supply of separate copies is available of this series of data sheets on various reactors built or projected throughout the world. Copies may be obtained from the publishers, Temple Press Limited, Bowling Green Lane, London, E.C.1, at the cost of packing and postage only (4d. each).

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